without hardness, and life-like. The text is interesting, and the number of food-grains described in excess of what most of us were aware existed. Prof. Church commences his work by what must have been to him a familiar task—describing the chief constituents of food, splitting up the sugars into their groups, and pointing out the differences between true nutrients and food-adjuncts. Part 2 is devoted to dietaries and rations. With Part 3 commences the peculiar merit and *raison d'être* of the work. After some remarks upon cereals generally, the reader is introduced *seriatim* to no fewer than twenty-three cereals, the only member of the group conspicuous by its absence being rye—a grain which occupies a very important place in Europe. The presumption is that it does not occur in India, but such a presumption surely presumes too much. Wheat is described as an annual grass of unknown origin, but we scarcely see why this *nescience* as to the origin of wheat should be especially set forth. Are we to infer that barley, oats, maize, rice, the millets, &c., are annual grasses of known origin? If so, would that the Professor had devoted a few lines in each case to this particular point! The origin of our food-grains is a deeply interesting subject, veiled, we are afraid, for the most part in mist, and only conjecturally outlined.

The author disclaims any special originality, and duly credits the works of Dr. Forbes Watson, and Messrs. Duthie and Fuller, as well as other authors, as sources from which he has industriously gathered information. Messrs. Duthie and Fuller's work, however, dealt but little with the chemistry or physiology of the plants they described, and they treated more exclusively of the cultivation of the various crops.

The interest of Prof. Church's book lies in the illustrations, which are super-excellent; in the analyses, many of which were made in the author's own laboratory; in fixing the nutrient-ratio and nutrient-value of so many foods; and, lastly, in the comprehensive view given of Indian cereal and other crops. The Indian local names and Sanskrit equivalents are also interesting. These are taken by our author on trust, but all or many of them also occur in Mr. Duthie's book, which would be a guarantee of their correctness.

JOHN WRIGHTSON

Tobacco a Farmer's Crop. By Philip Meadows Taylor. (London: Edward Stanford, 1886.)

This is a small book of seventy pages. The first half is occupied by pleasant matter relating to the history of tobacco in Europe not strictly or seriously relevant to the title. The latter half redeems the whole from the stigma of being unpractical. An interesting account is given of the despotic regulations of the "Régie des Tabacs," a Government Department which grants licenses for growing, manufacturing, and selling tobacco throughout France, and whose powers extend to the nomination of the cultivators, the variety of tobacco to be grown, the number of plants per hectare, and even the number of leaves permitted per plant, so that the unfortunate cultivator may and must give a perfectly accurate account of his yield down to a single leaf. The methods of cultivation followed in France are described plainly and apparently practically. The important question as to whether tobacco can be grown profitably in England is answered unhesitatingly in the affirmative, and a sensible scheme is propounded for bringing its culture into harmony with the Excise. The coldness exhibited by our Royal Agricultural Society towards the tobacco movement last April is strongly animadverted upon. As to our climate, Mr. Taylor writes as follows:—"It is stated to be too cold, too damp, too uncertain in England to allow of the introduction of the proposed culture. I cannot conceive or allow that there can exist any sensible difference between the climate of the southern counties of England and that of Picardy and Flanders. I do not take notice of Prussia and even Russia, where tobacco is grown. I believe that the general climate in Southern England is more genial than in the countries across the Channel, and I feel confident that in the said southern counties of England and in Ireland tobacco could be advantageously grown. I recall my former statement that the plant is only on the ground from June to September: cold winters, early frosts, and November fogs have naught to do with the question." The author does not appear to take into account the comparative coolness of the summer months in England, which has always prevented the successful growth of maize, vines, and probably tobacco also. This very readable little book, with its unstudied side-lights upon French rural life, and its pleasant style, may be recommended without any hesitation to the reading public.

JOHN WRIGHTSON

Marion's Practical Guide to Photography. (London: Marion and Co., 1886.)

Here we have a very good book, which contains all necessary information and useful hints for those who are practising the art of photography. The whole process is gone through in a very clear and easy way. Extra chapters are given on different parts of the subject, such as photographic optics, re-touching, portraiture, &c. On p. 95 a table of exposures is added, preceded by explanations, taking into consideration all the variations of scenes and subjects which the amateur is likely to come across. The manufacturers deserve great credit for publishing a book in which the best way of using their apparatus is described; a book published under such conditions ought to be truly practical, and one would think that the manufacturer of bad apparatus would not be too anxious to teach his customers how to find it out.

Lecture Notes and Problems on Sound, Light, and Heat. By Charles Bird, B.A., F.G.S. (London: Relfe Bros., 1886.)

For students who are attending lectures on these subjects this book will be very useful, as it contains the chief fundamental formulæ, set out in a very clear manner, and it is very compact, capable of being put into one's pocket without inconvenience.

Bicycles and Tricycles for the Year 1886. By H. H. Griffin, London Athletic Club. (London: L. Upcott Gill, 1886.)

Now that cycling has become so general, and consequently the cycle industry increased so largely, a book on the subject will doubtless be most welcome. We have here one which gives a *good* description, and in many cases a woodcut, of every known make, with the exception, perhaps, of one or two very new patterns which have been introduced very recently. We need not enter into the details from the scientific point of view, as they have been previously described (NATURE, vol. xxxiii. p. 132). A description of different varieties of bells, lamps, &c., is also given. Great pains seem to have been taken by the author to bring the book up to date, and to give an accurate account; each machine, as he tells us, having been examined by himself.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

Extension of the Corona

In reference to the failure of observers at the late eclipse to note any such extension of the corona as was seen in 1878, I

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desire to add my testimony to Mr. Common's opinion (NATURE, vol. xxxiv. p. 470), that the conditions of the sky must have been wholly different; and where the visibility of the corona is in question, the atmospheric diffusion is all-important.

We have a most trustworthy criterion of the amount of diffused sky light in the visibility of the moon's limb outside the sun on the coronal background. This appears not to have been observed at all last August, and it may be useful to recall what it looked like under certain almost ideal conditions, which are not likely to recur.

On July 29, 1878, I observed it in the remarkably clear air of Colorado, and at an altitude of over 14,000 feet, on Pike's Peak, and have a vivid recollection of its appearance then. After totality, and while writing my notes, I heard a call from some bystander of "Look at the moon!" and glancing up from the paper (with an eye which could not have been in a sensitive condition), saw the moon's limb outside the sun, most conspicuously defined by a band of pearly light, which faded outward, but whose visible width can be estimated from the fact that though I went on intermittently with my notes, and took no other precaution to shield the eye than keeping it in the shadow cast by my telescope stand, the limb continued in my view under these unfavourable circumstances for *four minutes and twelve seconds* after totality was over. A similar duration was recorded by Gen. Myer, the Chief Signal Officer of the United States, who observed near me; and others at a lower altitude certified to having observed it over three minutes. Something is due to the increased sensitiveness of the eye after the darkness, but there is no doubt that, with even the slight rest of the retina which totality afforded, the phenomenon was such a salient one as to force itself on the attention of those not regarding it.

This is for a very exceptionally pure sky, of course; but if, as is stated, observers specially seeking it could not even see the limb a little outside the sun (where the corona is brightest) last August, it seems clear that no conclusions as to its non-visibility under any ordinary means are to be drawn from negative evidence of such a kind. S. P. LANGLEY

Allegheny Observatory, Allegheny, Pennyslvania

The Astronomical Theory of the Great Ice Age

IN your issue of November 4 (p. 7), my friend Mr. W. H. S. Monck asks one or two questions relative to the paper on "The Astronomical Theory of the Great Ice Age" which you did me the honour to reprint.

I take as a convenient unit the mean daily sun heat on one hemisphere. The amount of this unit is indicated by the fact that it continuously maintains the earth's temperature some 300° more or less above what it would be were the sun's heat withdrawn.

The calculations I gave showed that in the glacial winter the mean daily receipt of heat sunk to ·68 of a unit, while in the brief glacial summer the mean daily receipt was 1·38 unit.

Considering the magnitude of the unit, it is obvious that fluctuations like this must correspond to vast climatic changes of the kind postulated in the Ice age. Here it seems to me lies the great originating cause of the Ice age, and to dwell on the minor phenomena merely obscures the real point.

If it be said that no great climatic change takes place because the total sun heat in the year remains the same, then I remark, as I did at the Royal Institution, that on this principle it would be the same thing to give a horse 15 lbs. of oats a day for six months and 5 lbs. a day for the other six months as to give him 10 lbs. of oats a day all the year round. ROBERT S. BALL

The Observatory, co. Dublin, November 11

P.S.—I take this opportunity of correcting a misprint in my paper as given in NATURE (vol. xxxiv. p. 608). The maximum number of days' difference between summer and winter is 465 × eccentricity.

Abnormality in Cats' Paws

AMONG the many interesting features suggested by the genealogical table in last week's NATURE (p. 40), showing the persistence of abnormality in the number of toes on a cat's paw, there is one the significance of which seems not to have occurred to, or to have been passed over by, Mr. Edward Poulton. The peculiarity I refer to is the larger percentage of abnormality among the female offspring than among the male. Taking "Tabby V." as a starting-point, and leaving out one abnormal kitten of which the sex was unnoted, as well as the families of which no particulars are given, the total number of descendants in the table is 36, of which 12 are males and 24 females. Of the 12 males, 5 are normal and 7 abnormal, or $41\frac{2}{3}$ and $58\frac{1}{3}$ per cent. respectively; and among the 24 females 7 are normal and 17 abnormal, or $29\frac{1}{6}$ and $70\frac{5}{6}$ per cent. respectively. Or, to put it in another way, among the 12 normal kittens 5 are males, 7 are females, or $41\frac{2}{3}$ and $58\frac{1}{3}$ per cent. respectively, instead of $33\frac{1}{3}$ and $66\frac{2}{3}$ per cent. as it should be; and among the abnormals 7 are males and 17 females, or $29\frac{1}{6}$ and $70\frac{5}{6}$ per cent. instead of $33\frac{1}{3}$ and $66\frac{2}{3}$.

This would seem to indicate either (1) that there is a greater tendency among the male offspring than among the female to revert to the normal condition, or (2) that there is a tendency among the offspring to inherit rather the peculiarities of the parent of their own sex—the male parent in all cases in the table being assumed to be normal. If rather, probably the former, though the latter could easily be tested by a similar set of observations with cats, the male parent of which was abnormal, the mothers being in each case normal.

J. HERBERT HODD

Hatton Garden, London, E.C., November 15

Abnormalities in the Vertebral Column of the Common Frog

IN preparing skeletons of the frog, my students came across the following abnormalities in the vertebral column, a record of which may be not without interest:—

(1) In a large *Rana temporaria*, the centrum of the eighth vertebra, instead of being biconcave (amphicœlous), is concavo-convex (procœlous), like that of the preceding vertebra. This abnormality I have observed before.

(2) In a medium-sized *Rana temporaria*, the eighth and ninth vertebræ are both abnormal. The ninth vertebra has well-developed only one transverse process (the right) for articulation with the ilium. The other (the left) is quite small and ill-shapen; there is is no anterior zygapophysis on this side. The centrum is anteriorly convex on the right side and concave on the left side. Posteriorly, there is on the right side a convex articular surface for the urostyle; but on the left side the articular surface is ill-developed and irregular. In the eighth vertebra, the left transverse process is abnormally large and strong, has a marked backward direction, and has taken on itself the sacral function on this side, articulating with the ilium. The right transverse process is nearly, but not quite normal. There is a right, but no left, posterior zygapophysis. The anterior end of the centrum is normally concave; but the posterior end is convex on the left side and concave on the right side. The urostyle and the ilia are slightly modified in accordance with the abnormalities of the vertebræ. C. LLOYD MORGAN

University College, Bristol

Influence of Wind on Barometric Readings

ALLOW me a few words of supplement to Prof. Abbe's useful letter in NATURE of November 11, p. 29.

Sir H. James's paper is perhaps better known on this side of the Atlantic than Prof. Abbe thinks; but there undoubtedly is too great a tendency to rush into print without previously reading up what has been done. The great bibliographical work which the Signal Office has in hand will do more to check this evil than anything which could be suggested, and hence its enormous importance.

As regards the application of suction to anemometers, no reference is made to that of Bourdon,[1] of which my friend Dr. Fines was recently kind enough to show me a very fine specimen at work at his observatory at Perpignan.

The Cowl Committee of the Sanitary Institute, far from being (as has been imagined) asleep or dead, has been very hard at work, and will in a few months report the result.

I sincerely hope that Lord Rayleigh will accede to Prof. Abbe's suggestion, but in the interim I append the report of Lord Rayleigh's Southampton paper which appeared in the *Meteorological Magazine* for October 1882, p. 130:—

"'On the Effect of Wind on the Draught of Chimneys,' by Prof. Lord Rayleigh, F.R.S.

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[1] See also Laughton, "Historical Sketch of Anemometry," *Quart. Journ. Roy. Met. Soc.* vol. viii. (1882), p. 177.

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